
LIVE TRAINING
LTEC: Enabling Componentized TESS Procurement using a Service Oriented Architecture
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LTEC
LIVE TRAINING
APPLIED RESEARCH ASSOCIATES, INC.
GENERAL DYNAMICS
C4 Systems
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Outline

- Traditional System Based Procurement
- PM TRADE Vision: Component Based Procurement
- Live Training Engagement Composition (LTEC)
  - Architecture Overview
  - How LTEC facilitates component based procurement
  - Use Cases

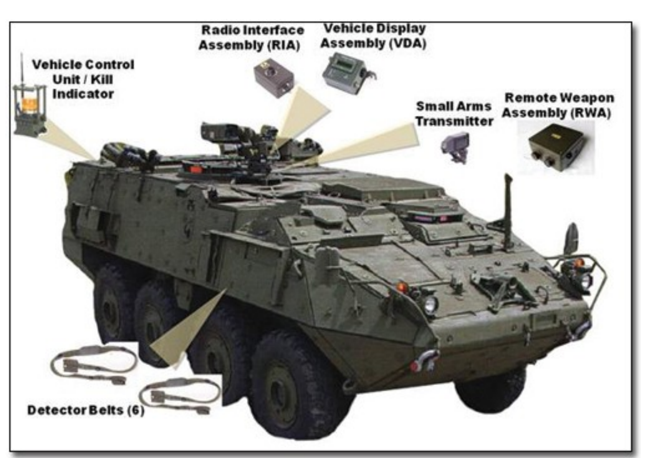


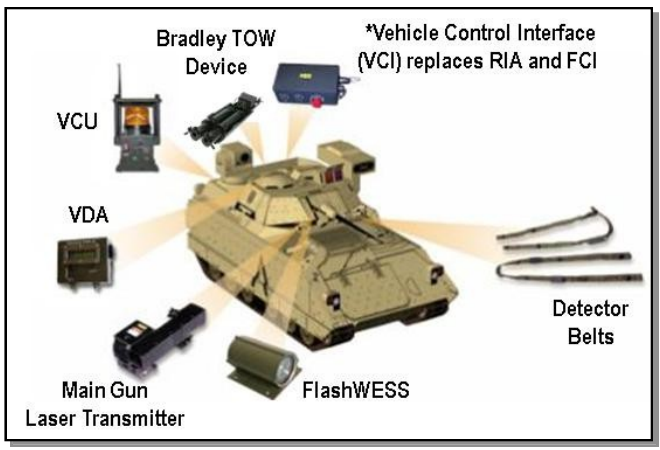


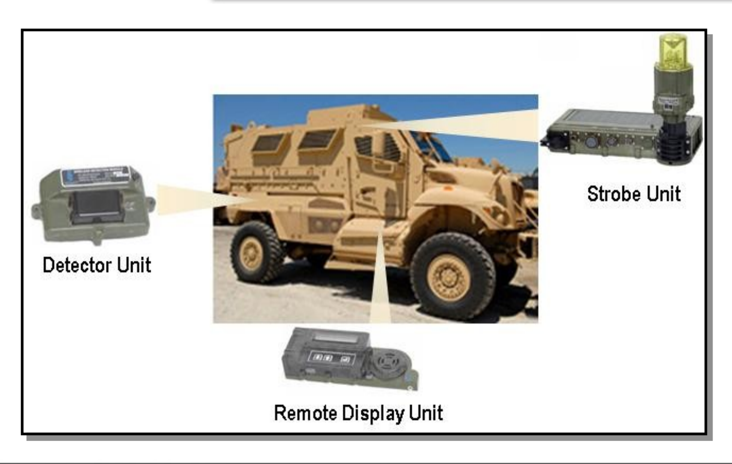
Traditional System Based Procurement

- **Currently, the complete TESS system is purchased**

MILES XXI









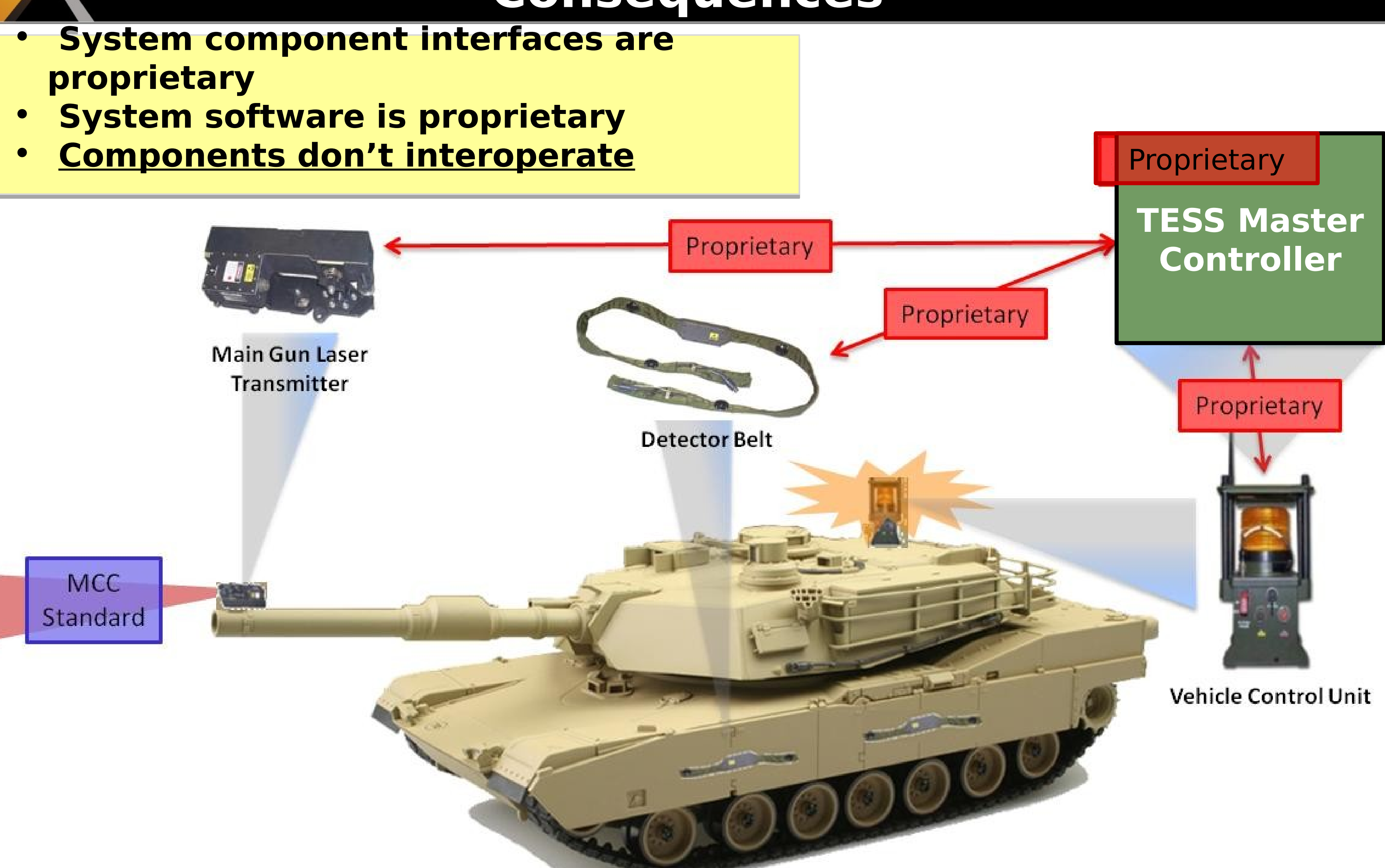


MILES WITS **MILES TVS** **MILES IWS**



System Based Procurement Consequences

- System component interfaces are proprietary
- System software is proprietary
- <u>Components don't interoperate</u>



Problems: System Based Procurement

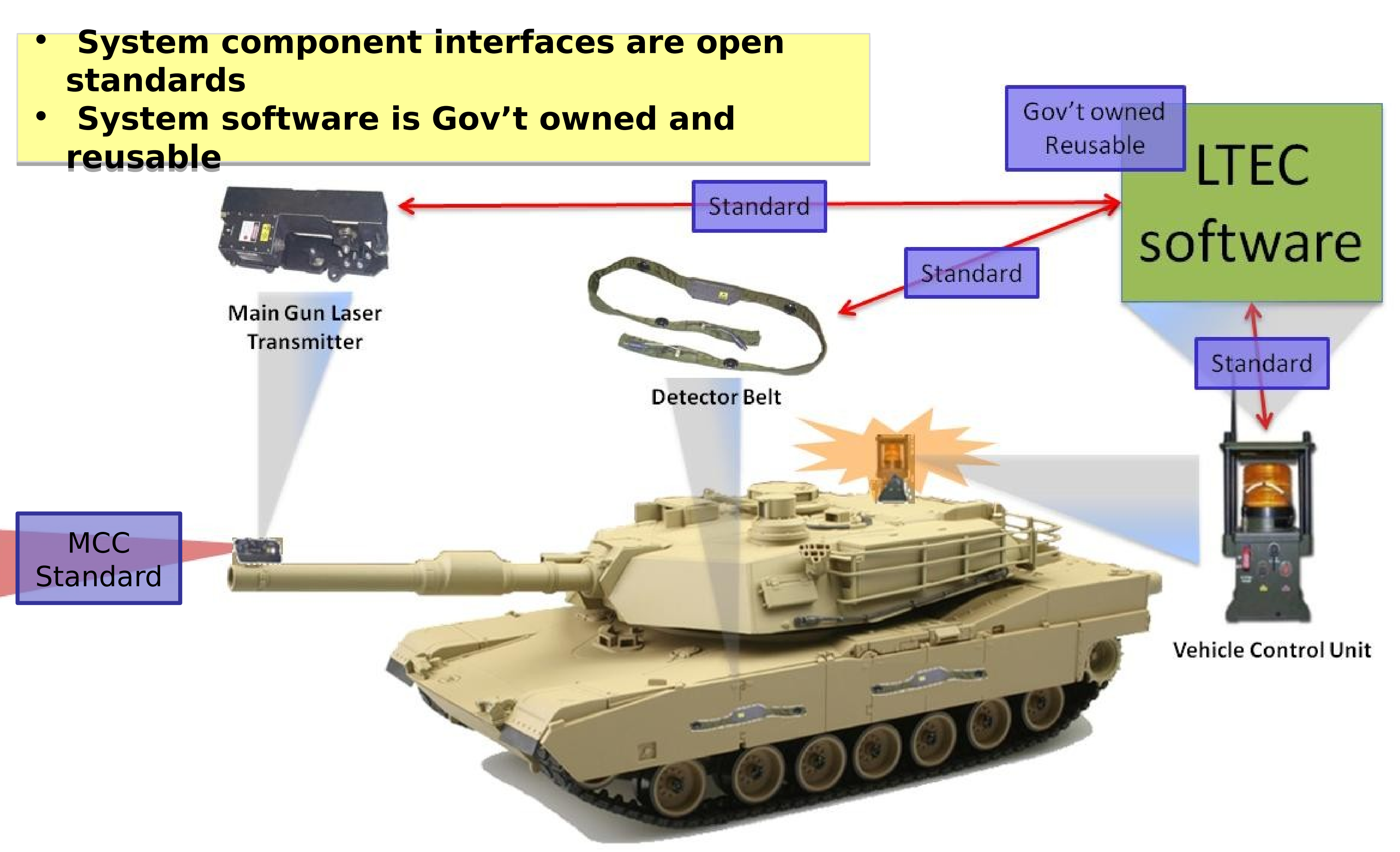
- Product Manager for Live Training Systems (PM LTS) purchases a complete TESS kit
- Incumbent vendor difficult to unseat due to proprietary interfaces
- Each vendor implements TESS master controller functionality

- Results
  - High sustainment cost
  - Low competition
  - Low innovation due to no Government R&D dollars
    - Dependent on contractors' IR&D funding for innovations
  - Master controller behaviors aren’t consistent between systems



Solution: Component Based Procurement

- System component interfaces are open standards
- System software is Gov't owned and reusable



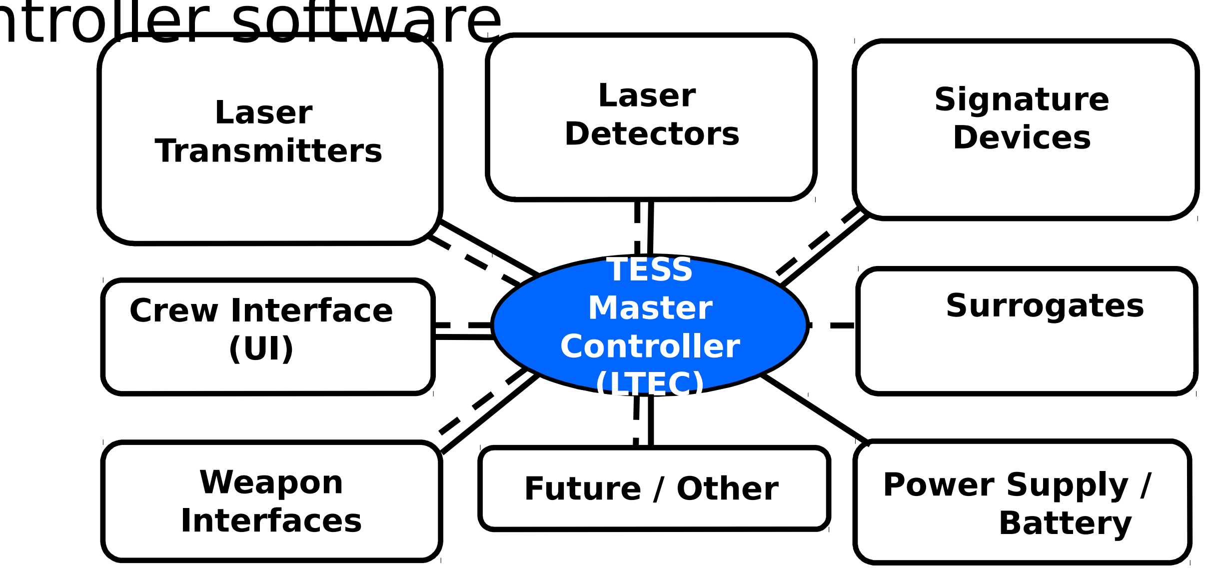
Component Based Procurement Details

- Product Manager for Live Training Systems (PM LTS) purchases components which interoperate through government managed standards
- Vendors re-use government developed TESS master controller software
- Results
  - Lower cost due to re-use and ability to acquire only necessary components
  - More competition because of published interface standards
  - Consistent master controller behavior



Live Training Engagement Composition (LTEC) Vision

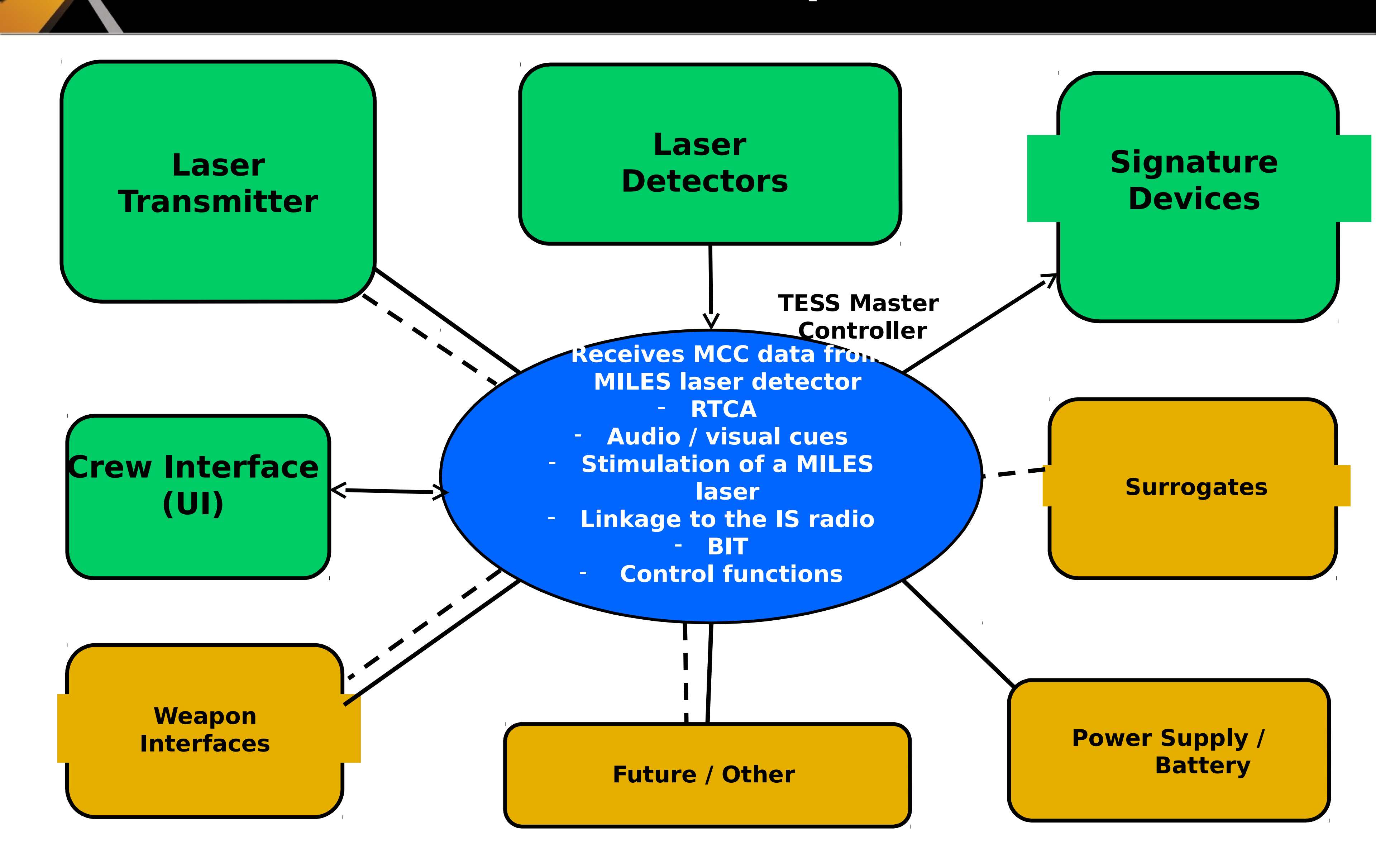
- Provide common government owned TESS master controller software



- Goals
  - Reduce development and procurement costs
  - Integrate with various hardware configurations
  - Enable adapting quickly to new and changing requirements
  - Mature and promote interface standards
  - Enable interoperability between components



LTEC Functional Capabilities



Service Oriented Architecture (SOA)

Today
- ICD

Interface Between two systems or subsystems
- Physical
- Business
  - Messages
  - Processing Responsibilities

Next
- Physical Standard/ICD
- SOA

Loose coupling between services
- Service Capability Definition
- Service Business Logic

Higher rates of change Use SOA

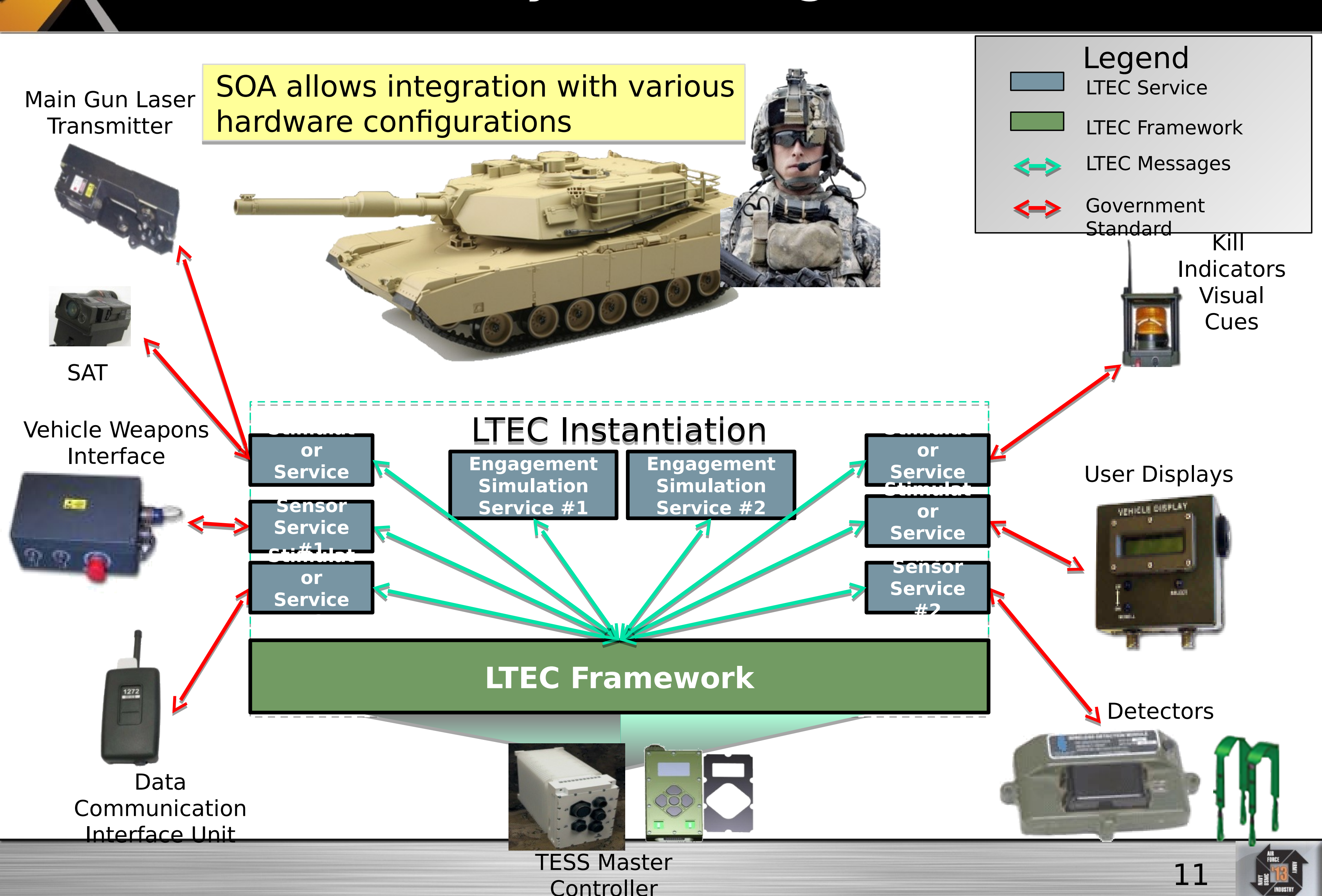
Stable – Low rates of change

Use Standards

Layer	Example
Application Network Process to Application	SOA
Presentation Data Representation	SOA
Session Communications	e.g. Full-Duplex, Simplex, …
Transport End-to-End Connectivity	e.g. TCP/IP, …
Network Logical Addressing	e.g. IPv4, IPv5, …
Data Link Physical Addressing	e.g. MAC, WAN, LAN, …
Physical Physical Signal Transmission	e.g. RS232, USB, IEEE 802.11 …



TESS System using LTEC



LTEC Architecture

CAL ensures standards interoperability
OSAL enables platform independence

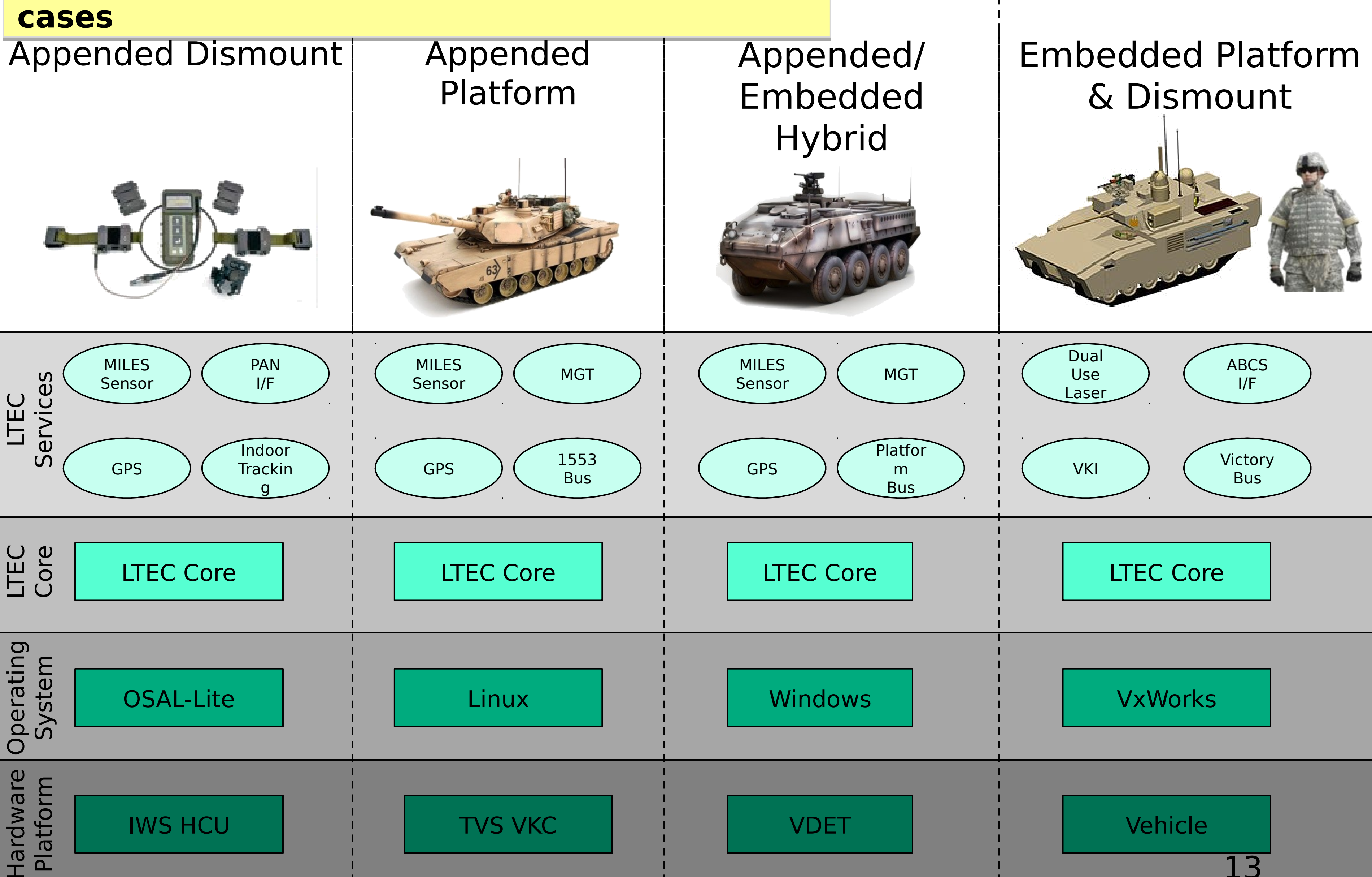
LTEC Composition

- CAL
  - Contains implementations of government standards
  - Abstracts protocol details from services
  - Ensures interoperability - devices that interface with LTEC must comply with standards
- OSAL
  - Abstracts OS dependent functions
  - Facilitates LTEC platform independence



LTEC Use Cases

SOA and OSAL enable support for multiple use cases

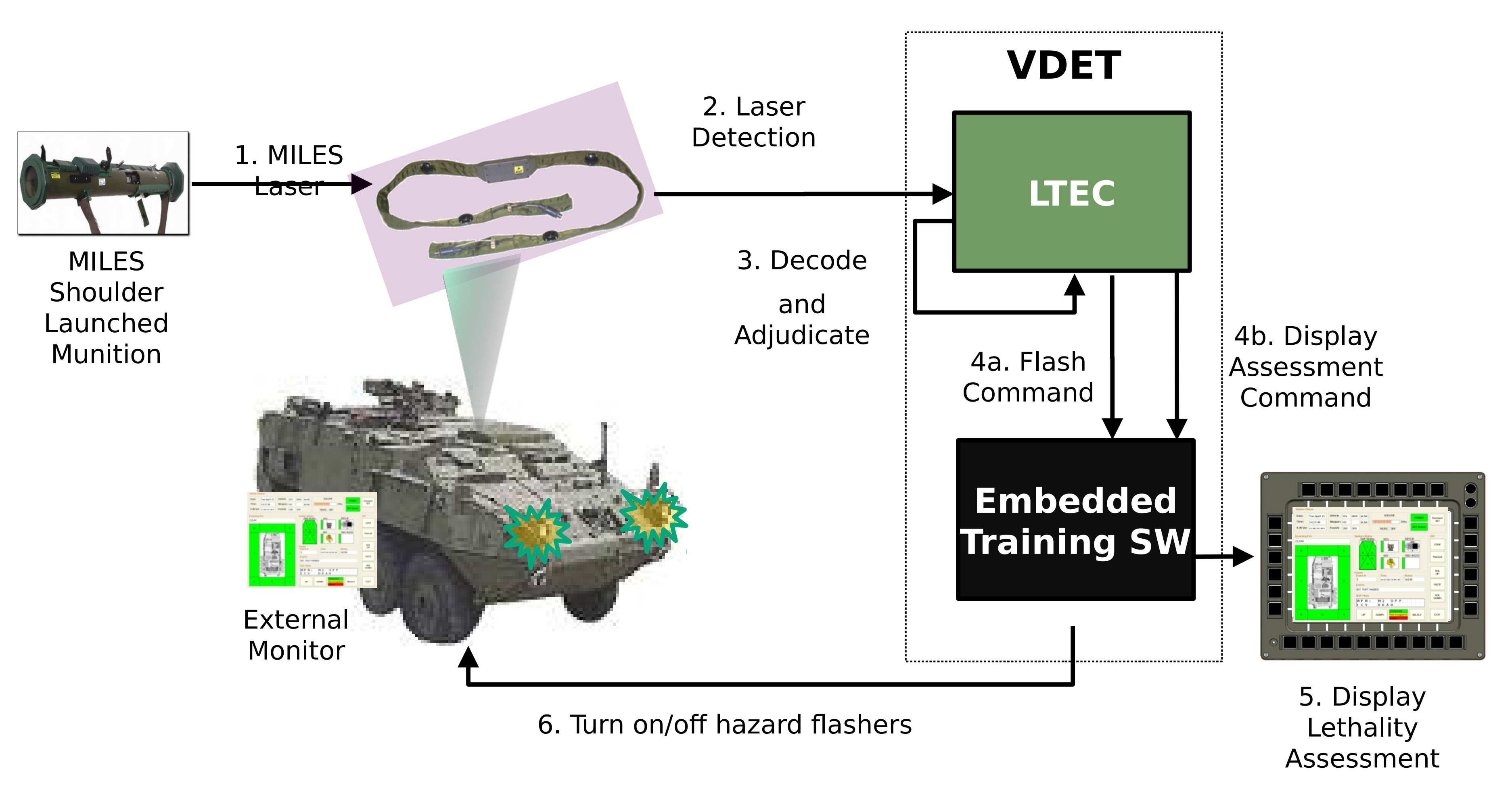


Demonstrated Use Case: LTEC Appended/Embedded Hybrid on Stryker

- Goals
  - Embed MILES capability on Army vehicle using LTEC
  - Reduce/remove appended hardware
  - Show hardware dual-use
  - Communicate through interface standards
- Results
  - Embedded LTEC on Stryker's Video Display Electronic Terminal (VDET) (dual-use)
  - Appended MILES XXI detector belts
    - Removed MILES XXI vehicle control unit
  - Dual-used Hazard Flashers to provide kill indication
  - Used PAN Standard for new message comms

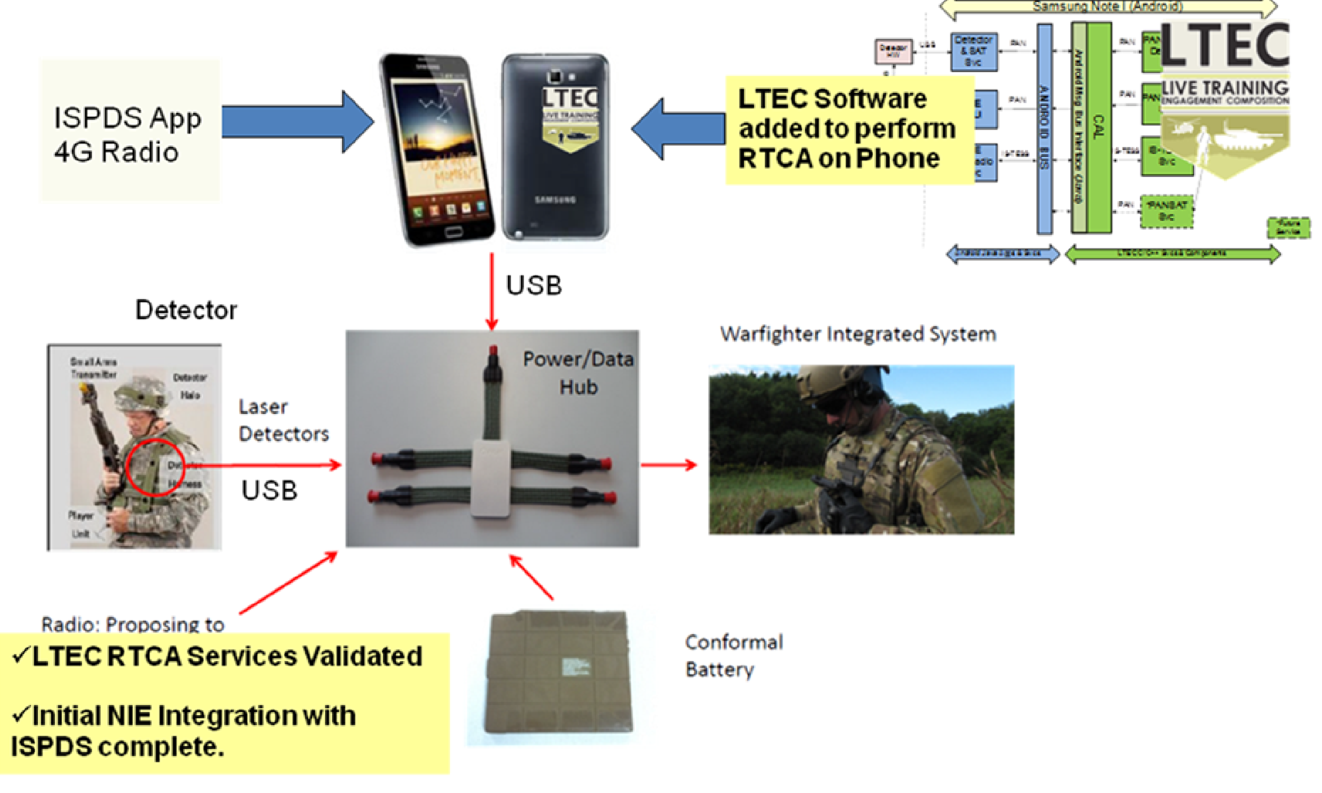


Demonstrated Use Case: LTEC Appended/Embedded Hybrid on Stryker

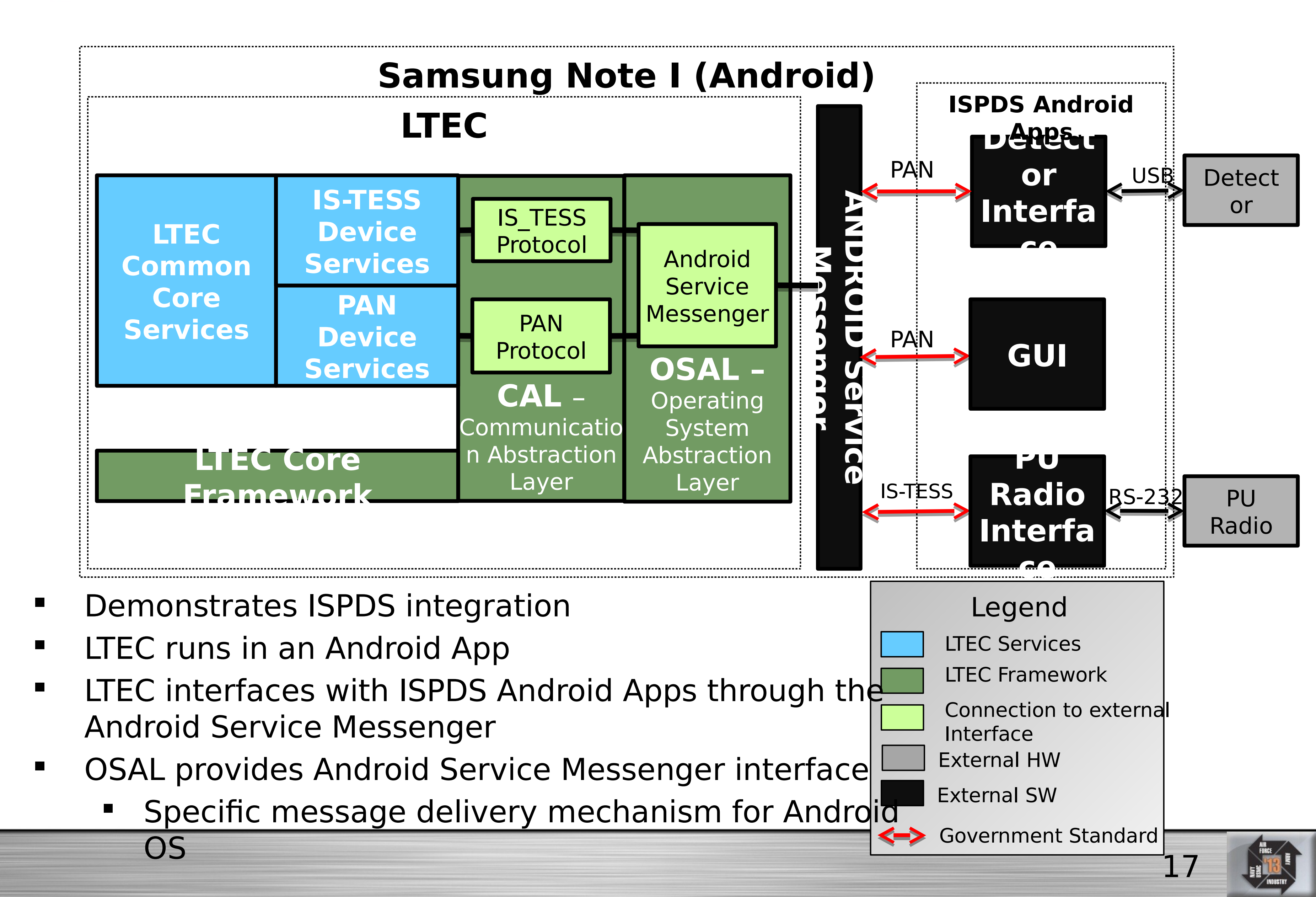


Demonstrated Use Case: LTEC on Dismount

- Goals
  - Demonstrate LTEC RTCA for Dismounts
  - Integrate with Integrated Soldier Power and Data System (ISPDS) TESS Android Apps



Demonstrated Use Case: LTEC on Dismount



- Demonstrates ISPDS integration
- LTEC runs in an Android App
- LTEC interfaces with ISPDS Android Apps through the Android Service Messenger
- OSAL provides Android Service Messenger interface
  - Specific message delivery mechanism for Android OS

Conclusion

- System based procurement has resulted in high sustainment costs
- PM TRADE vision: Component Based Procurement
  - Government owned standards
  - Common TESS master controller software (i.e. LTEC)
- LTEC enables component based procurement
  - Ensures interoperability between independently developed TESS components
  - Allows integration with various hardware configurations and use cases
  - Platform/OS independence allows deployment on multiple hardware platforms
- Other LTEC benefits
  - Reuse provides common behaviors and lowers cost
  - Allows quickly adapting to changing requirements
  - Facilitates technology insertion
- Demonstrated LTEC use cases
  - Stryker embedded/appended hybrid



Questions?

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